UNITED STATES DEPARTMENT OF AGRICULTURE

FARMERS BULLETIN

WASHINGTON, D. C. 729 JULY 19, 1916

Contribution from the Bureau of Plant Industry, Wm. A. Taylor, Chief.

CORN CULTURE IN THE SOUTHEASTERN STATES.

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CONTENTS.

INTRODUCTION.

The area involved in the discussion of this subject includes North Carolina, South Carolina, Georgia, Florida, and Alabama. The recommendations and suggestions made apply mostly to the cotton-growing portion of those States.

PREPARING LAND FOR CORN.

DRAINAGE.[1]

Poor drainage is indicated in many fields by the irregular patches in which little or no corn grows. Even if actual drowning does not occur in these places, the growth is so weakened and retarded that worms commonly destroy the stand. Besides the regular means of draining, applications of coarse stable manure are recommended.

CONSERVATION OF RAINFALL.

Although the average annual rainfall ranges from 46 to more than 60 inches and is comparatively well distributed, the most common need of the corn crop is more moisture at some time in its development. Preparation of the land so that it will retain larger quan-

[1] See Smith, A. G., Tile drainage on the farm, U. S. Dept. Agr., Farmers' Bul. 524, 27 p., 15 fig., 1913.

tities of water for longer periods is therefore very important and will give greater returns on the investment than any other one part of the crop's culture. The capacity of a soil for moisture will depend much upon the depth to which the land is plowed and the quantity of humus (decaying vegetable matter) incorporated with it.

PLOWING.

Land should be broken from 8 to 10 inches deep. If the land is in a poor state of cultivation this is best accomplished by turning only that part which previously has been broken and loosening the rest of the depth with a subsoil plow. The subsoil plow will be most efficient when it is made to follow in the furrow of the turnplow. In following seasons the land may be turned deeper, the increased depth varying with the quantity of vegetable matter incorporated

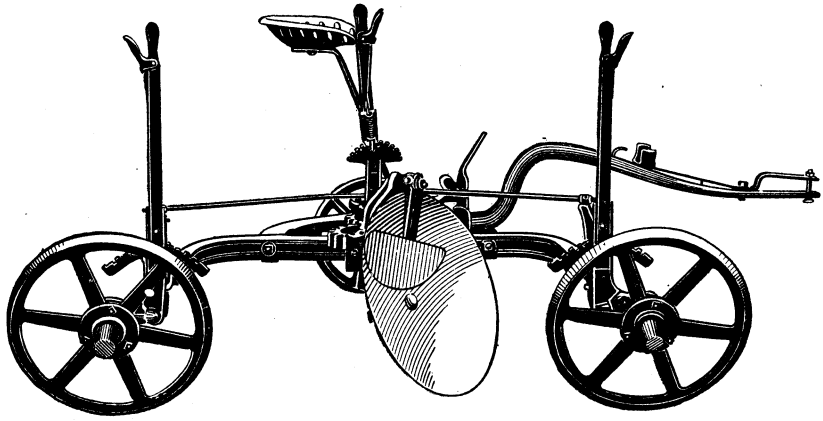

FIG. 1.—A reversible disk plow.

during the last preparation. When a soil of the required depth has been established, the turnplow may be run from 6 to 8 inches deep at each preparation and the subsoil plow only as often as seems necessary to prevent the formation of a compact layer just below the depth of the turnplow.

In order that the plows may accomplish the greatest amount of pulverizing, the work should be done when samples of the soil crumble most readily in the hand. The period when the best work may be done frequently passes before all of the land can be prepared. If the surface of the land is thoroughly pulverized with a disk harrow or other implement as soon as it is dry, the period for efficient work will be greatly extended.

Figure 1 illustrates a disk plow that reverses, so that the furrows may all be turned in one direction. It is especially valuable on steep hillsides and where it is necessary to avoid open furrows.

Figure 2 illustrates a type of walking turnplow that is adapted to the mixed sand and clay soils of the South Atlantic States.

Well-adapted harrows and other types of tools for pulverizing and smoothing the soil after it has been broken are now common in every community. Frequently, however, the land is not worked until its surface has dried. The closer the breaking plows are followed by the surface tools, the less time and labor it will require to do the work.

HUMUS.

Nothing will do more to economize the labor of tilling the land and to prolong the good effects of tillage than the presence of an ample quantity of humus in the soil. All land intended for the profitable cultivation of corn should be stocked with such material as soon as possible. The best preparatory crops for corn are the legumes, some of which are cowpeas, velvet beans, vetch, the clovers,

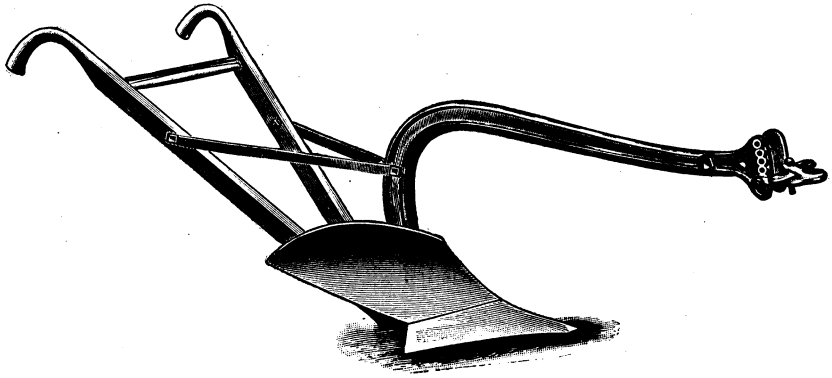

FIG. 2.—A good type of walking turnplow.

and beggarweeds. These crops may be made to supply much vegetable matter and, in addition, a part or all of the necessary nitrogen.

Manure produced in connection with the raising of live stock always has been associated with the highest type of agriculture. An inconsiderable amount of it is at present produced on most farms, because there are so few animals. Its great value, however, in connection with the production of corn and other crops should command careful consideration.[1]

COMMERCIAL FERTILIZERS.[2]

Commercial fertilizers should be used to supply such elements of plant food as can not be supplied by the soil and by cropping systems

[1] See Beal, W. J., Barnyard manure, U. S. Dept. Agr., Farmers' Bul. 192, 32 p., 4 fig., 1904.

[2] For a general discussion of the whole subject of commercial fertilizers, see the following: Voorhees, E. B., Commercial fertilizers: Composition and use, U. S. Dept. Agr., Farmers' Bul. 44, 24 p., 1896; Beavers, J. C., Farm practice in the use of commercial fertilizers in the South Atlantic States, U. S. Dept. Agr., Farmers' Bul. 398, 24 p., 2 fig., 1910.

in sufficient quantities for the greatest profit. Usually it is desirable to supply nitrogen, phosphoric acid, and potash in some one or more of their various forms. The proportions of these fertilizer constituents that it is necessary to use vary with the soil and the general cropping system.

Extensive tests over a long period of years are urgently needed as a guide in choosing a fertilizer for each of the many different conditions in the section. At present some of the most satisfactory data available are those of the North Carolina Agricultural Experiment Station. These cover a period of 10 or 12 years in the Coastal Plain and Piedmont sections of North Carolina. As a result of these tests, the station mentioned recommends the following fertilizer formulas and practices for the average unimproved sandy and sandy-loam soils in the Coastal Plain section and for the clay and clay-loam soils in fair condition in the Piedmont section of that State. These recommendations, printed in small type in the following paragraphs, are taken from Circular No. 18 of the North Carolina station.

Fertilizer formulas for the Coastal Plain section.

No. 1.

	Pounds.
Acid phosphate, 16 per cent phosphoric acid	600
Cottonseed meal, 6.17 per cent nitrogen, 2.8 per cent phosphoric acid, and 1.8 per cent potash	1,200
Kainit, 12 per cent potash	200
	2,000

This mixture will contain: Available phosphoric acid, 5.5 per cent; potash, 2.3 per cent; nitrogen, 3.7 per cent (equal to ammonia, 4.5 per cent).

No. 2.

	Pounds.
Acid phosphate, 16 per cent phosphoric acid	765
Cottonseed meal, 6.17 per cent nitrogen, 2.8 per cent phosphoric acid, and 1.8 per cent potash	650
Nitrate of soda, 15 per cent nitrogen	265
Kainit, 12 per cent potash	320
	2,000

In this formula one-half of the nitrogen is supplied by nitrate of soda and the other one-half by cottonseed meal. This mixture will contain: Available phosphoric acid, 7.0 per cent; potash, 2.5 per cent; nitrogen, 4.0 per cent (equal to ammonia, 4.9 per cent).

No. 3.

	Pounds.
Acid phosphate, 16 per cent phosphoric acid	680
Cottonseed meal, 6.17 per cent nitrogen, 2.8 per cent phosphoric acid, and 1.8 per cent potash	935
Nitrate of soda, 15 per cent nitrogen	125
Kainit, 12 per cent potash	260
	2,000

In this formula one-fourth of the nitrogen is supplied by nitrate of soda and the other three-fourths by cottonseed meal. This mixture will contain: Available phosphoric acid, 6.8 per cent; potash, 2.4 per cent; nitrogen, 3.8 per cent (equal to ammonia, 4.6 per cent).

No. 4.

	Pounds.
Acid phosphate, 16 per cent phosphoric acid	650
Cottonseed meal, 6.17 per cent nitrogen, 2.8 per cent phosphoric acid, and 1.8 per cent potash	1,300
Muriate of potash, 50 per cent potash	50
	2,000

This mixture will contain: Available phosphoric acid, 7.0 per cent; potash, 2.4 per cent; nitrogen, 4.0 per cent (equal to ammonia, 4.9 per cent).

No. 5.

	Pounds.
Acid phosphate, 14 per cent phosphoric acid	1,170
Dried blood, 13 per cent nitrogen	715
Muriate of potash, 50 per cent potash	115
	2,000

This mixture is quite concentrated on account of the high-grade phosphatic and potassic materials used and will contain: Available phosphoric acid, 8.2 per cent; potash, 2.9 per cent; nitrogen, 4.6 per cent (equal to ammonia, 5.6 per cent).

Fertilizer formulas for the Piedmont section.

No. 1.

	Pounds.
Acid phosphate, 16 per cent phosphoric acid	750
Cottonseed meal, 6.17 per cent nitrogen, 2.8 per cent phosphoric acid, and 1.8 per cent potash	1,250
	2,000

This mixture will contain: Available phosphoric acid, 7.8 per cent; potash, 1.1 per cent; nitrogen, 3.9 per cent (equal to ammonia, 4.7 per cent).

No. 2.

	Pounds.
Acid phosphate, 16 per cent phosphoric acid	930
Cottonseed meal, 6.17 per cent nitrogen, 2.8 per cent phosphoric acid, and 1.8 per cent potash	680
Nitrate of soda, 15 per cent nitrogen	280
Kainit, 12 per cent potash	110
	2,000

In this formula one-half of the nitrogen is supplied by nitrate of soda and the other one-half by cottonseed meal. This mixture will contain: Available phosphoric acid, 8.4 per cent; potash, 1.3 per cent; nitrogen, 4.2 per cent (equal to ammonia, 5.1 per cent).

No. 3.

	Pounds.
Acid phosphate, 16 per cent phosphoric acid	835
Cottonseed meal, 6.17 per cent nitrogen, 2.8 per cent phosphoric acid, and 1.8 per cent potash	980
Nitrate of soda, 15 per cent nitrogen	135
Kainit, 12 per cent potash	50
	2,000

In this formula one-fourth of the nitrogen is supplied by nitrate of soda and the other three-fourths by cottonseed meal. This mixture will contain: Available phosphoric acid, 8.1 per cent; potash, 1.2 per cent; nitrogen, 4.0 per cent (equal to ammonia, 4.9 per cent).

No. 4.

	Pounds.
Acid phosphate, 16 per cent phosphoric acid	1,200
Dried blood, 13 per cent nitrogen	740
Muriate of potash, 50 per cent potash	60
	2,000

This mixture is a concentrated one on account of high-grade nitrogenous and potassic materials being used, and will contain: Available phosphoric acid, 9.6 per cent; potash, 1.5 per cent; nitrogen, 4.8 per cent (equal to ammonia, 5.8 per cent).

NITRATE OF SODA.

This material is quick acting because of its easy solubility in water. For this reason, when used in a considerable quantity in fertilizers at time of planting, especially on light sandy land, there is considerable danger of its being leached beyond the reach of the roots of the plants before they can use it. On clay lands and loams having good subsoils to them, this danger does not exist, certainly not to the extent that it does on light soils. A small amount of nitrate of soda in the mixture will give the crop a quick start and make its cultivation easier and more economical. Formula No. 3 has been arranged with this idea in view, and in No. 2 one-half the nitrogen comes from nitrate of soda. On light lands it would likely be better to omit the nitrate from the mixture and apply it as a top-dressing between the 10th and last of June on early corn. Nitrate of soda may take the place of a portion of the other

nitrogen-furnishing materials in any of the formulas, 1 pound of nitrate being equal in its content of nitrogen to 2.4 pounds of cottonseed meal, 1.8 pounds of fish scrap, or 1.2 pounds of dried blood. Nitrate of soda is frequently used as a top-dressing for corn and is a very valuable material for use in this way. A good application is 50 to 75 pounds per acre, distributed along the side of the row or dropped beside the plants and 3 or 4 inches from them, or else where there is a ridge in the center it may be distributed on this, and when it is thrown out the nitrate will be thrown to the two sides of the row.

APPLICATION OF FERTILIZERS TO CORN.

On clay lands and loams having good subsoil the fertilizer should be applied in the drill, at or just before planting, at the rate of 200 to 400 pounds per acre. On light sandy lands it is best to use 50 to 100 pounds in the drill at time of planting, to give the crop a good start, and the balance of the fertilizer as a side dressing when the corn has begun to grow well.

No part of the method of culture requires more intelligence on the part of the grower than the proper supply of commercial fertilizer to corn. For the man who is able and willing to meet the conditions in each case as they arise, the following suggestions are offered: Apply all the fertilizer that supplies nothing but phosphorus and potash on the line of the row at or before the time of planting. It should be mixed with the soil as thoroughly and widely as is practicable. If experience has shown that the early growth is liable to be so slow and weak that there is difficulty in getting a stand, from 25 to 30 pounds of nitrate of soda should be distributed with the seed. The remaining portion of the necessary nitrogen should be supplied from time to time while cultivating the corn. The amount of nitrogen supplied in this way should be governed somewhat by the rate at which the corn is growing. As a general rule, the early applications should be comparatively light and the late applications comparatively heavy, the idea being to avoid an excessively rapid and tender growth at any time and thus avoid some of the damage that is always likely to result from a drought.

Nitrate of soda is the best form in which to supply nitrogen by this system.

Fertilizer attachments for cultivators are the best devices for distributing nitrate of soda.

FERTILIZERS FOR CORN FOLLOWING PEAS AND OTHER LEGUMES.

The best and most profitable yields of corn in our experimental work were where the corn followed soy beans, bur clover, cowpeas, crimson clover, and other leguminous crops. These crops, with acid phosphate and kainit or some other potash salt, are the best previous treatment and fertilization for corn. Where light crops of peas have been grown in corn or cut from the land and the stubble left, it would be safest to add some nitrogenous material in the fertilizer mixture. In cases of this kind it is suggested that the nitrogen-furnishing material in any of the preceding formulas be reduced one-half. Where corn is to follow good crops of cowpeas, soy beans, bur and crimson

clovers, especially where the entire crop has been left on the soil, no further application of nitrogen need be made, but it is advised that 200 to 300 pounds per acre of the following mixture, in the drill, be used just before planting:

	Pounds.
Acid phosphate, 16 per cent	200
Kainit, 12 per cent	100

RESULTS IN SOUTH CAROLINA.

The South Carolina Agricultural Experiment Station reports in Bulletin No. 178 of that station that at Summerville, S. C. (in the Coastal Plain), a formula approximating 10 per cent phosphoric acid, 4 per cent potash, and 3.3 per cent nitrogen (equal to 4 per cent ammonia) is the best for those conditions. This bulletin also indicates that acid phosphate is the most profitable source of phosphorus under the conditions specified.

PLANTING.

TIME OF PLANTING.

There is considerable latitude allowed for planting, because of the long seasons. The question is frequently raised whether one should plant early (from the middle of March to the first week in April) or late (May 1 to July 1).

In considering the question, the budworm or southern corn rootworm (*Diabrotica duodecim-punctata* Oliv.) is probably the most influential factor.

Over the greater part of the area considered, the worms appear most abundantly in April, though this period varies with the latitude and the weather. Many farmers try to plant either before or after this main attack. It has been shown,[1] however, that the adult insect is usually on hand to lay eggs even before corn can be planted, and it is therefore likely that if the soil conditions are favorable to the insect the early-planted corn will have but little success in avoiding the worms. On the other hand, corn planted from the first to the 10th of May (depending on the latitude) will suffer practically no damage from these worms.

It has been observed that a cold, wet soil favors budworms. It is probable that artificial drainage and coarse farm manure will do much to dispose of this trouble and thereby render the grower more independent as to the time of planting.

Much of the land in these States has fairly good drainage and the soil early becomes warm and well aerated. On this land the budworms usually do little or no damage at any time, and the

[1] Turner, W. F. Bud-worms in corn. Ala. Agr. Exp. Sta. Cir. 8, 7 p., 1 fig., 1911.

farmer is thus freed from the limitations just mentioned. On such land the heaviest yields of corn are usually obtained by planting as soon as a permanent stand can be secured.

MANNER OF PLANTING.

On warm well-drained land it has become very popular to plant corn in the water furrows left by plowing the land into beds, the width being that desired between the rows.

Planting in furrows has three special advantages:

(1) The growth of corn planted in furrows is for the most part easily controlled.

(2) The cultivation of furrow-planted corn at the time when root injury is usually most serious consists largely of working down the soil of the bed about the corn. Injury to the roots by the cultivators is therefore hardly possible.

(3) Corn planted in furrows is much more easily kept clean in the row than that planted on the level, because in bedding many of the weed seeds are thrown out of the furrows and as the corn grows the earth is filled in about the plants and the weeds and grass that start there are easily covered.

The preparation of the furrows is usually made a special consideration after the land has been broken flat. The land is first bedded with a plow, a disk harrow, or a disk cultivator. The beds are made wide enough so that the furrows between them will be properly spaced for the rows. Another way that requires less labor and that protects the young corn from the wash of the beds is to open the furrows for planting with a middle breaker. The beds are then completed by throwing the soil away from the rows during the early cultivation. When the subsoil is naturally hard and the land is broken less than 8 inches deep, the bottom of these furrows is frequently loosened as deep as is practicable. The ordinary 1-horse planter is well adapted to planting in these furrows and on beds.

On land that has been properly prepared, much of the above-described labor may be eliminated, time saved, and the work better done by using a lister. These machines open the furrow and plant the corn below the level at the same time. They insure a uniform depth for the seed and make it possible to plant the seed shallow and at the same time in moist soil. Figures 3 and 4 show good types of the lister. These two forms are intended for compact land, but will give satisfaction in freshly plowed land if it contains considerable sand. Figure 5 shows a field that has been planted with one of these machines. The rows shown in this illustration were 3½ feet wide, but any other width may be used.

When the lister is used and it is desirable to apply commercial fertilizer before planting, a fertilizer drill should precede the planter on the line of the row and distribute the fertilizer slightly above the depth the lister is run. By so doing, the lister will spread the

fertilizer to at least the width of its cutting edge and to both sides of the seed, and the danger of injuring the sprouting corn by contact with the fertilizer will be removed.

On poorly drained clay land, corn frequently will be drowned out if planted in furrows, especially if these are deep. Any clay land that has had shallow preparation will tend toward the same trouble. Under these conditions the furrows must be shallow or the planting made on the level of the land.

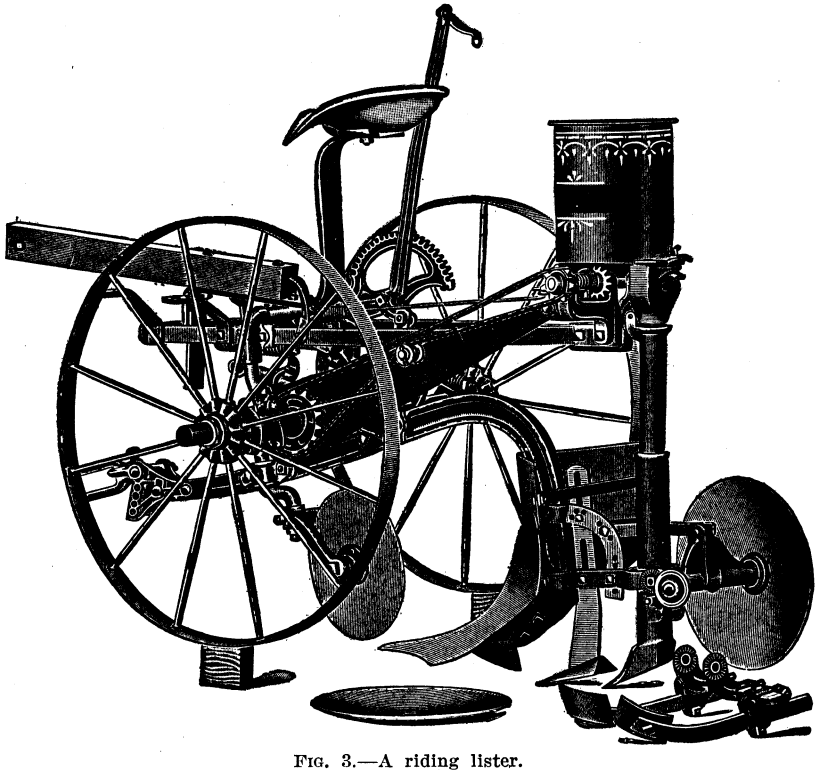

FIG. 3.—A riding lister.

In some cases on low coast land, corn must be planted in beds, so that after rains the water will be permitted to escape before the crop is damaged. It is then advisable to make the beds wide enough for two or more rows.

In planting, the seed should be covered just deep enough to have sufficient moisture in which to germinate promptly. A depth greater than this tends to weaken the plants and thus lessens their chances for success. On well-prepared clay land, and especially where the planting is in a furrow, a half inch of cover may be sufficient. When the soil is dry, cloddy, or otherwise poorly conditioned for planting it is necessary to plant deeper.

DISTRIBUTION OF PLANTS.

The best distribution of plants over the land is obtained by making the distances between single plants in the row and the distances between rows the same. With such an equal distribution, the least possible loss from competition is experienced. However, in order that sufficient plants be grown upon an acre to utilize most completely the resources of the soil and climate and at the same time permit intertillage and other desirable practices, it is usually necessary to sacrifice some of the advantages to be gained by even distribution for those to be gained by other desirable cultural practices. These cultural methods frequently may be altered so as to reduce this loss, and the greatest saving in this connection is by means of implements specially adapted to this work. Where general-purpose implements are used, distances between rows of as much as 5 or 6 feet are often considered necessary. By preparing the land

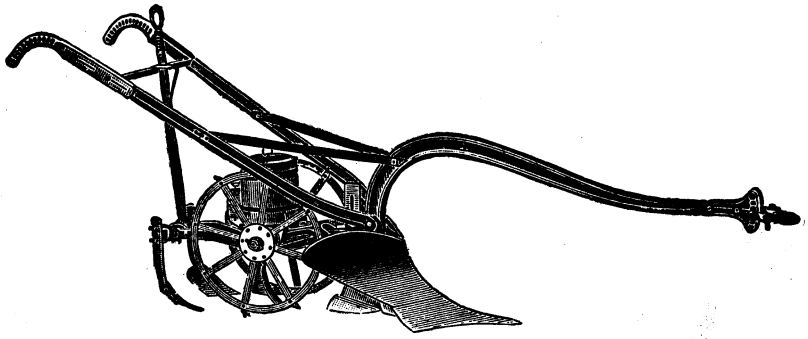

FIG. 4.—A walking lister.

thoroughly and then using highly specialized machinery for planting and cultivating the corn, the rows need be no more than 3½ feet apart and the distances between plants in the rows can be increased accordingly.

NUMBER OF PLANTS PER ACRE.

The number of plants per acre required for the best results will depend more or less upon the natural fertility of the land, the quantity of fertilizer used, the method of culture practiced, the time of planting, the evenness of the distribution of plants, whether other crops are grown with the corn, the variety, and the season.

The season is, of course, the most important factor influencing the stand required and, as its character can not be foretold, it is evident that specific advice in this connection can not be given.

In practice, corn is commonly planted in stands ranging from 3,630 to 7,260 plants per acre, or 6 to 12 square feet per plant. Most stands of corn have been planted with an allowance of 8 to 12 square feet per plant.

Probably the most important factor involved in the proper adjustment of the stand to the ever-varying environment lies within the variety itself. Plants of all varieties of corn tend to adjust themselves to their growing conditions by increasing or decreasing the stalk yields. As a general rule, the varieties capable of the widest range of adjustment are those that have a strong tendency to produce more than one ear per stalk.

SECURING A STAND.

One of the most deplorable losses due to defective stand is from the blank spaces seen to a greater or less extent in practically every field. The ability of the plants to utilize extra space rapidly diminishes as the distance increases, and the practical limit probably does

FIG. 5.—A field after planting with a lister.

not exceed 5 or 6 feet. Beyond this distance the loss so far as the corn crop is concerned is complete.

Good seed of a uniform size and shape is an important factor in securing a stand. Special bulletins upon seed corn can be obtained without cost from the United States Department of Agriculture.[1]

Burrowing animals and birds frequently do serious damage to the stand by eating the seed or by pulling up the very young plants. Odorous substances have been tried in various ways to prevent such attacks. The substance that is most favorably considered for this purpose at present is coal tar, because it seems successful as a repel-

[1] Hartley, C. P., and Webber, H. J. The production of good seed corn; with an appendix on selection and care of seed corn. U. S. Dept. Agr., Farmers' Bul. 229, 23 p., 10 fig., 1905.

Duvel, J. W. T. The germination of seed corn. U. S. Dept. Agr., Farmers' Bul. 253, 16 p., 4 fig., 1906.

Hartley, C. P. Seed corn. U. S. Dept. Agr., Farmers' Bul. 415, 12 p., 3 fig., 1910.

lent, it will not injure the seed, costs very little, and may be dried so as to plant freely in a machine. It is recommended[1] that the seed be wet with warm water before adding the tar. A teaspoonful of the tar will be sufficient for a peck of corn. The mass must be thoroughly mixed and then dried before planting.

Blank spaces are commonly due to clods and trash that prevent the planter from properly packing the seed in fine moist earth. This trouble can be practically eliminated by using a lister.

In wet, cold land the seed sometimes is covered with too much soil. On such land the seed should be planted just deep enough to have it in contact with moist soil.

Large quantities of acid fertilizer applied in the row at or about the time the corn is planted may kill sprouting seed or cause the plants to be weak. The trouble may be overcome by making the application ten days or two weeks earlier.

In cold weather or on low, flat, or otherwise poorly drained land the seed may germinate badly, and the plants that start are slow in growing and weak. Worms, grass, and weeds are likely to destroy such corn if it is not assisted. From 25 to 30 pounds of nitrate of soda per acre, applied with the corn drill at the time the corn is planted, will quickly force the young plants past the period of greatest loss and thus greatly increase the chances of securing a stand.

Whenever it is at all difficult to get the desired stand, extra seed should be planted to offset the loss. Thinning will usually result in greater economy than leaving a defective stand or replanting.

CULTIVATION.

Cultivation may be for one or more reasons. Some of these are as follows:

(1) By cultivating the soil away from the row while the corn is young it may retard the rate of growth and thus under certain conditions will favor the success of the crop.

(2) By cultivating the beds between rows of furrow-planted corn to a level, the corn may be suddenly put within immediate reach of the soil's greatest fertility. This done at the right time will favor the greatest production of grain.

(3) Weed destruction is one of the most important functions of cultivation. Weeds are most easily destroyed as they are coming through the surface of the ground. Thorough surface cultivation will suffice at this time. When weeds and grass are well started, not only is there a rapid exhaustion of the moisture and plant food in the soil, but the cultivation necessary to remove them will often seriously damage the crop by covering the corn and, when planted on or above the level, breaking its roots.

(4) When it is desirable to supply commercial fertilizer to the growing crop it is sometimes necessary to mix the application with the soil. For this, cultivation may be required, and the most practicable way is to combine this with one of the usual cultivations.

[1] See Scheffer, T. H., Treating seed corn to protect it from burrowing animals, Kans. Agr. Exp. Sta. Cir. 1, 4 p., 1909.

(5) Shallow early cultivation by maintaining a loose soil mulch will conserve soil moisture. Deep early cultivation by permitting more air to enter will dry and warm the soil about the corn. After corn is from 2 to 3 feet high (varying with the width between rows), its roots so fill the soil that it is believed that practically no moisture on its way to the surface can escape them. For this reason, late cultivation for the sole object of conserving moisture is now considered impracticable.

EARLY CULTIVATION.

When corn is planted in furrows, the early cultivation need consist of little more than harrowing the bottom of the furrows on both sides of the row. If the furrows were made with a lister, a harrow of the type shown in figure 6 is the best. The uniform furrows guide the different sections of the harrow. The mules or horses walk upon the beds and soon require but little attention. One man is thus able to cultivate as many as five rows at a time. If the furrows were made by other means, as previously described, the early cultivation may be done with cultivators of the type shown in figure 7. In this case, the clevis will have to be so adjusted that the horse or mule can walk

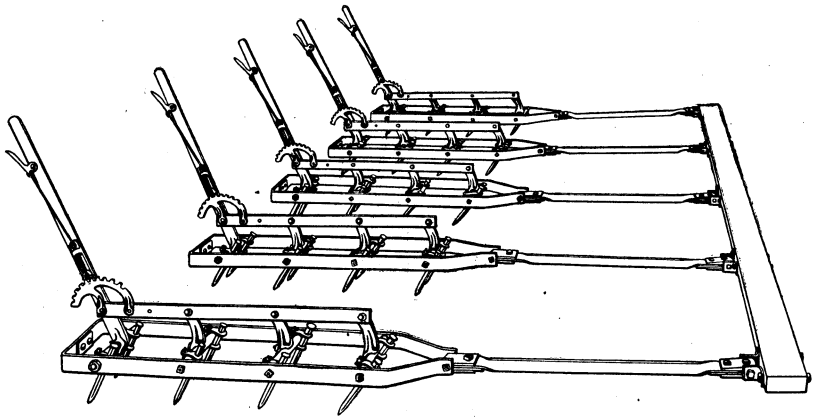

FIG. 6.—A harrow for cultivating corn in lister furrows.

just to one side of the row, while the cultivator works both sides of it. It is also necessary to remove at least one of the teeth on each side. The early cultivations of furrow-planted corn should leave the furrows entirely open. If it is desirable to leave them open very late, the beds may require cultivation in order to prevent the growth of weeds, and this can be done with a disk cultivator set to throw the soil away from the rows.

LATE CULTIVATION.

The late cultivation of furrow-planted corn consists in filling the furrows with soil from the beds. For this, the disk cultivators are among the best. This leveling process may be done in one or more cultivations, as seems desirable. It may be delayed until it is ap-

parent that the corn is about to start tasseling, if the weeds do not become a menace. As the roots at this time will not have gone upward into the beds that have been formed between the rows, a loose, deep, rich mulch may thus be thrown about the stalks without the slightest damage, leaving the crop well prepared to pass its most critical period.

In order to destroy weeds, other cultivations may follow the leveling of the land. This should be done, however, with surface-working cultivators, so that it will not be possible to cultivate deep.

A smoothing harrow with teeth pointing backward, or, where the soil is very fine and mellow, a horse weeder with long spring

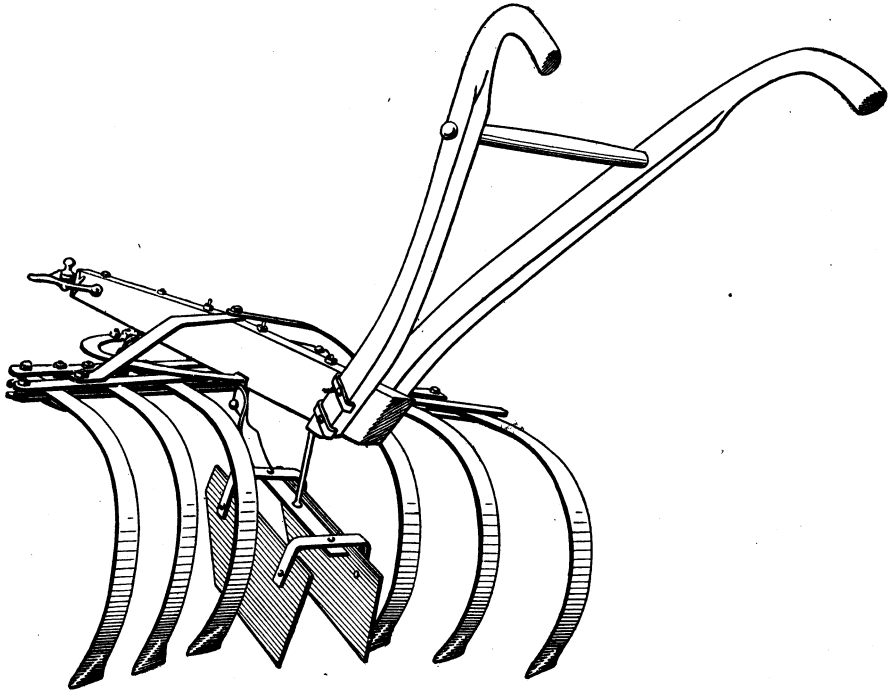

FIG. 7.—A cultivator that can be used to cultivate corn in an ordinary water furrow.

teeth, may be used until the corn is 6 inches high for the cultivation of corn planted on or above the level of the land. After this, any cultivator that will not exceed a depth of 2 inches may be used. When the corn is drilled, the weeds in the row will have to be removed with a hand hoe. In some cases the corn may be planted in hills, so that it can be cultivated both ways. Much hoeing may thus be eliminated.

Figure 8 illustrates a type of cultivator that is especially adapted to the cultivation of corn in furrows made by a lister. This one cultivates two rows at a time, but 1-row cultivators of this type are made.

These machines are so constructed that they are guided by the furrow, and when properly adjusted anyone who is able to drive the team can cultivate two rows at a time in the best manner possible. In using these cultivators, the rows are usually gone over once or twice with the disks set to throw the soil from the corn. During the third cultivation the disks are set to throw the soil to the corn, and at this time the furrows are nearly filled. The fourth and last cultivation is usually done with a high-arched cultivator of one of the types shown in figures 9 and 10. In each of these illustrations the cultivators are equipped with scrapers that smooth the land behind the disks or knives. For the fourth cultivation, the gangs on the disk cultivator should be set to throw toward the row, or in the opposite direction from that shown. This cultivation may also be done with harrows or any other tool that will cultivate shallow (from 1 to 2 inches deep) and leave the land free from ridges and furrows.

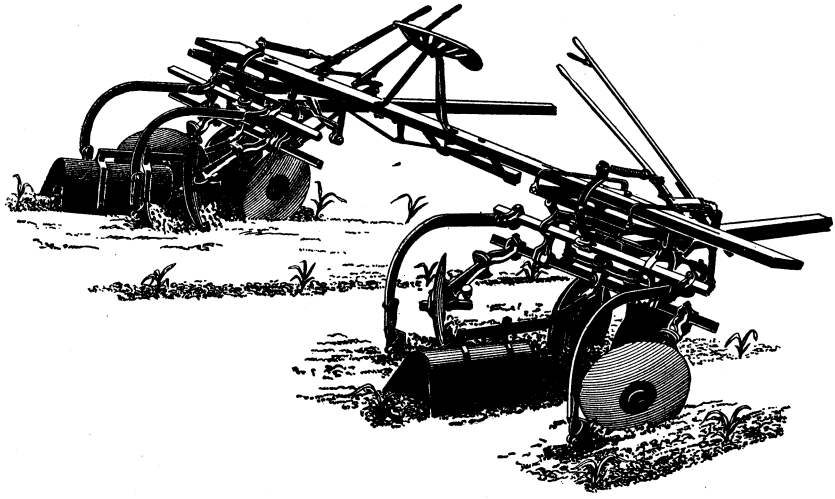

FIG. 8.—A cultivator specially constructed for the first two or three cultivations of lister-planted corn.

Figure 11 shows cultivators equipped with fertilizer attachments, so that a side application may be made at the time the cultivation is done. Fertilizer-distributing attachments can be made for most kinds of corn cultivators, and manufacturers will produce them when there is a sufficient demand. In a large portion of the section covered by this bulletin such attachments, conveniently and substantially made for the types of cultivators illustrated in figures 8, 9, and 10, should not only economize the time and labor necessary for distributing the fertilizer, but by being able to supply the fertilizer at each of the cultivations a farmer would not need to apply a large quantity at any one time, and the danger of overstimulating growth would be practically eliminated.

SUMMARY.

The recommendations and suggestions made in this bulletin apply mostly to the cotton-growing sections of North Carolina, South Carolina, Georgia, Florida, and Alabama.

Drainage and coarse stable manure should be used to prevent the irregular patches in the field in which little or no corn grows.

More of the rainfall is retained when the land is broken from 8 to 10 inches deep and vegetable matter is supplied.

Humus economizes the labor of tilling the land and prolongs the good effects of cultivation.

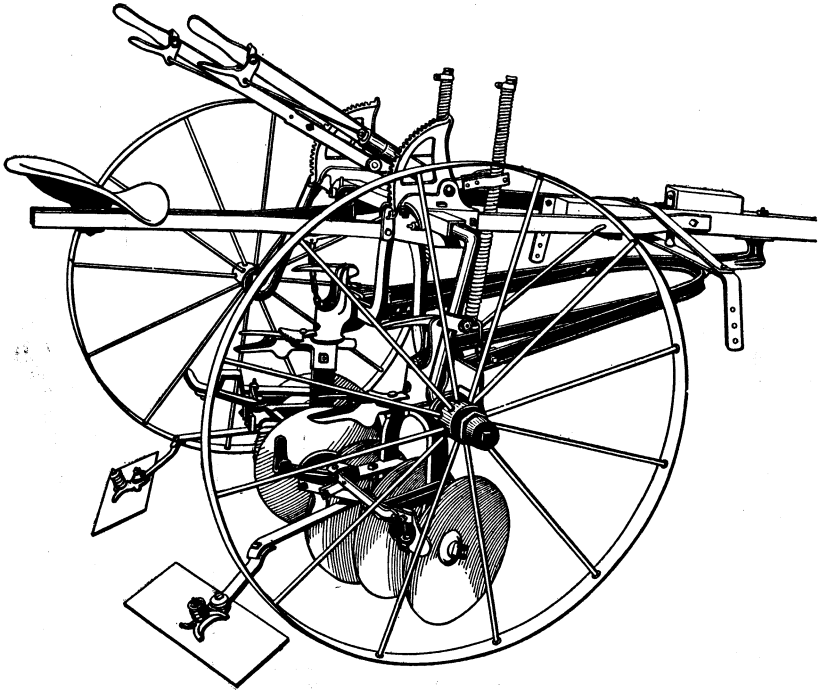

FIG. 9.—A disk cultivator equipped and adjusted so the land will be left level.

Crops like cowpeas, velvet beans, vetch, the clovers, and beggarweed may be made to supply both humus and nitrogen.

Commercial fertilizers should be used to supply such elements of plant food as can not be supplied by the soil and by cropping systems in sufficient quantity for the greatest profit.

The fertilizer formulas published by the North Carolina and South Carolina agricultural experiment stations are recommended.

Budworms may make it necessary to plant after the first of May, but drainage and coarse stable manure may relieve this condition.

The heaviest yields of corn are usually obtained by planting as soon as a permanent stand can be secured.

On warm well-drained land corn in furrows has the advantage over that planted by other methods, because its growth may be better controlled, serious injury to the roots in cultivating is avoided, and weeds and grass are more easily combated. Methods of preparing

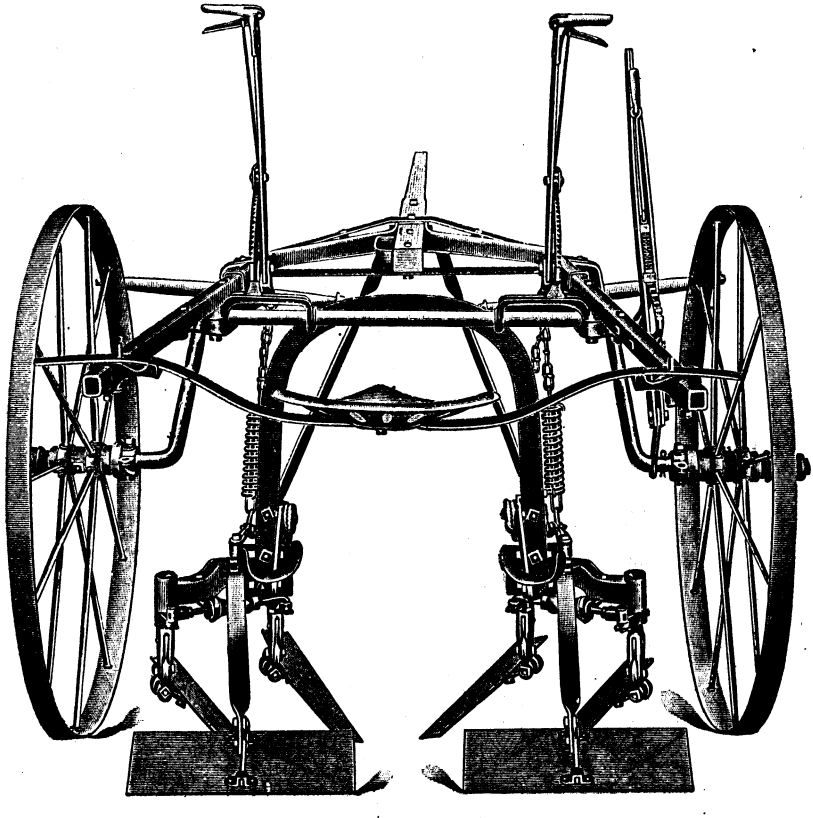

FIG. 10.—A cultivator specially adapted for level shallow cultivation.

furrows and planting in them are described and special attention is called to the desirability of using the lister.

The seed should be covered just deep enough to have sufficient moisture in which to germinate promptly.

A more uniform distribution of plants, resulting from a decrease in the distance between rows and an increase in the distance between plants in the rows, is often desirable, and this may be accomplished by the use of special machinery.

Most stands of corn have been planted so as to allow from 8 to 12 square feet per plant. Plants of all corn varieties tend to adjust themselves to their growing conditions by increasing or decreasing

the stalk yields, but as a general rule the varieties capable of the widest range of adjustment are those that have a strong tendency to produce more than one ear per stalk.

Burrowing animals and birds may be prevented from eating the seed and pulling up the young plants by using coal tar.

Where present methods fail to give a stand in cloddy or trashy land, a lister will usually succeed.

From 25 to 30 pounds of nitrate of soda applied with the corn drill at the time of planting will quickly force the young plants

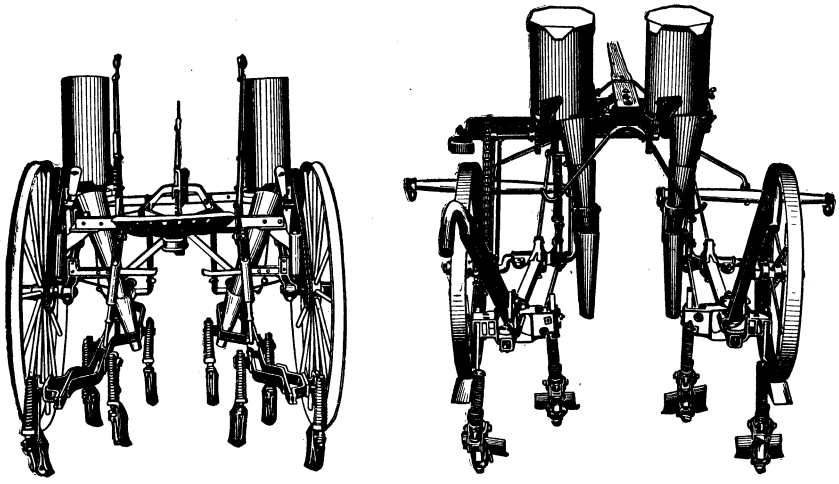

FIG. 11.—Riding and walking cultivators equipped with fertilizer distributors.

past the period of greatest loss and thus, where the conditions are trying, will greatly increase the chances of securing a stand.

Where it is at all difficult to get the desired stand, extra seed should be planted. Thinning will usually result in greater economy than leaving a defective stand or replanting.

Five distinct functions of cultivation are specified. Desirable types of cultivators are illustrated and methods of using them described. In connection with cultivation, means for a more practicable way of distributing commercial fertilizer are suggested and special devices for doing so are illustrated.

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